APPENDIX A

ACRONYMS AND DEFINITIONS

A . ACRONYMS

AFPEO/CB	Air Force Program Executive Office/Combat Systems Support
AF/XOM	Headquarters USAF, Director for Modeling, Simulation and Analysis
ALSP	Aggregate Level Simulation Protocol
AMG	Architecture Management Group
ARPA	Advanced Research Projects Agency
ASD	Assistant Secretary of Defense
ASD(C3I)	ASD for Command, Control, Communications and Intelligence
ASD(RA)	ASD for Reserve Affairs
C^2W	Command and Control Warfare
C^3I	Command, Control, Communications, and Intelligence
C^4I	Command, Control, Communications, Computers, and Intelligence
CMMS	Conceptual Model of the Mission Space
DAB	Defense Acquisition Board
DAS P	Data Administration Strategic Plan
DDR&E	Director of Defense Research and Engineering
DDRS	Department of Defense Repository System
DIA	Defense Intelligence Agency
DIS	Distributed Interactive Simulation
DISA	Defense Information Systems Agency
DJS	Dirctor, Joint Staff
DMA	Defense Mapping Agency
DMSO	Defense Modeling and Simulation Office
DoD	Department of Defense
DoNMSMO	Department of the Navy M&S Management Office
DOT&E	Director, Operational Test and Evaluation
. DREN	Defense Research and Engineering Network
DRTWG	Data and Repositories Technology Working Group
DSB	Defense Science Board
DSI	Defense Simulation Internet
DUSA (OR)	Deputy Under Secretary of the Army for Operations Research
DUSD	Deputy Under Secretary of Defense
DUSD (R)	DUSD for Readiness
EXCIMS	Executive Council for Modeling and Simulation
FDAd	Functional Data Administrator
FWG	Functional Working Group
FY	Fiscal Year
HLA	High–Level Architecture

IEEE	Institute of Electrical and Electronic Engineers
iMSRR	interim M&S Resource Repository
J-8	The Joint Staff, Director for Force Structure, Resources & Assessment
JROC	Joint Requirements Oversight Council
J-7	The Joint Staff, Director for Operational Plans and Interoperability
JSIMS	Joint Simulation System
JTASC	Joint Training, Analysis, and Simulation Center
JWARS	Joint Warfare System
JWFC	Joint Warfighting Center
M&S	Modeling and Simulation
MCMSMO	Marine Corps M&S Management Office
MLS	Multi-Level Security
ModSAF	Modular Semi-Automated Forces
MSEA	Modeling and Simulation Executive Agent
MSIP	Modeling and Simulation Investment Plan
MSOSA	Modeling and Simulation Operational Support Activity
MSRR	Modeling and Simulation Resource Repository
MSWG	Modeling and Simulation Working Group
N096	Oceanographer of the Navy
N6	Director, Space & Electronic Warfare
N7	Director of Naval Training
N8	Deputy Chief of Naval Operations for Resources, Warfare Requirements & Assessments
OD(PA&E)	Office of the Director, Program Analysis & Evaluation
OD (TSE&E)	Office of the Director, Test, System Engineering and Evaluation
OOTW	Operations Other Than War
OSD	Office of the Secretary of Defense
PDU	Protocol Data Unit
PPBS	Planning, Programming, and Budgeting System
PR	Primary Responsibility
PSA	Principal Staff Assistant
RF	Radio Frequency
RTI	Runtime Infrastructure
S IMNET	Simulation Network
STOW	Synthetic Theater of War
STOW- E	Synthetic Theater of War-Europe
TBD	To be determined
Ucc	Unified Combatant Command
UJTL	Universal Joint Task List
USACOM	U. S. Atlantic Command
USCENTCOM	U. S. Central Command
USD	Under Secretary of Defense
USD (A&T)	USD for Acquisition & Technology
USD(C)	USD for Comptroller
USD(P)	USD for Policy

USD(P&R)	USD for Personnel and Readiness
USEUCOM	U s . European Command
USPACOM	u. s. Pacific Command
USSOUTHCOM	u. s. Southern Command
USSPACECOM	u. s. Space Command
USSOCOM	u. s. Special Operations Command
USSTRATCOM	u. s. Strategic Command
USTRANSCOM	u. s. Transportation Command
V&V	Verification and Validation
VCJCS	Vice Chairman of the Joint Chiefs of Staff
VVA or VV&A	Verification, Validation, and Accreditation
VV&C	Verification, Validation, and Certification

B. **DEFINITIONS**

1. **Accreditation**. The official certification that a model or simulation is acceptable for use for a specific purpose.

2. Aggregate **Level Simulation Protocol** (ALSP) . A family of simulation interface protocols and supporting infrastructure software that permit the integration of distinct simulations and war games. Combined, the interface protocols and software enable large-scale, distributed simulations and war games of different domains to interact at the combat object and event level. The most widely known example of an ALSP confederation is the Joint/Service Training Confederation (Corps Battle Simulation; Air Warfare Simulation; Joint Electronic Combat/Electronic Warfare Simulation; Research, Evaluation, and System Analysis; Marine Air-Ground Task Force - Tactical Wargaming System; Tactical Simulation; Combat Service Support Training Simulation System) which has provided the backbone to many large, distributed, simulation-supported exercises. Other examples of ALSP confederations include confederations of analytical models that have been formed to support U.S. Air Force, U.S. Army, and U.S. Transportation Command studies.

3. Aggregation. The ability to group entities while preserving the collective effects of entity behavior and interaction while grouped. (See also definition of disaggregation.)

4. **Architecture**. The structure of components in a program/system", their interrelationships, and principles and guidelines governing their design and evolution over time.

5. **Authoritative** Representation. Models, algorithms, and data that have been developed or approved by a source which has accurate technical knowledge of the entity or phenomenon to be modeled and its effects.

6. **Command Forces** (CFOR) . An ARPA ADS Program with the goal to represent C4I in DIS.

7. Command and Control Warfare (C2W). The integrated use of operations security, military deception, psychological operations, electronic warfare, and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary C2 capabilities, while protecting friendly C2 capabilities against such actions.

8. Commander in Chief (CINC). A position established under the authority of 10 U.S.C. (reference (j)) to designate an officer assigned by the President as the Commander of a Unified Combatant Command and who is directly responsible to the President of the United States and Secretary of Defense for the performance of missions assigned to that command by the President or by the Secretary of Defense with the approval of the President. Subject to the direction of the President, the Commander of a Unified Combatant Command performs his duties under the authority, direction, and control of the. Secretary of Defense and is directly responsible to the Secretary of Defense for the preparedness of the command to carry out missions assigned to the command.

9. Common-use M&S. M&S applications, services, or materials provided by a DoD Component to two or more DoD Components.

10. Complex Data. Data that cannot be characterized as a single concept, atomic data element as defined in DoD 8320.1-M-1 reference (k) . Complex data includes most scientific and technical data. It has been recently categorized by the Complex Data Task Force into:

a. Highly derived data (e.g., probability hit/kill);

b. Objects utilizing the concepts of multiple inheritance (e.g., student-assistant is subclass of student class and employee class) , multiple root hierarchies (e.g. , a tank is a vehicle and a tank is a weapon where "vehicle" and "weapon" are each roots) , and polymorphic attributes (e.g., "capacity" for different types of aircraft may mean number of people, pounds of cargo, or gallons of fuel) ;

c. Compositions such as command hierarchies, road networks, images (binary large objects) , compound documents; and,

d. Artifacts of legacy systems and physical constraints (e.g., aircraft category and mission in one data element, intelligence facility code where the first few bytes define how the rest of the field is used).

11. Computer Generated Forces (CGF). A generic term used to refer to computer representations of forces in simulations that attempts to model human behavior sufficiently so that the forces will take some actions automatically (without requiring man-in-

the-loop interaction) . Also referred to as Semi-automated Forces (SAFOR). DoD programs addressing various levels of computer automation of forces include Command Forces, Intelligent Forces, Modular Semi-Automated Forces, Integrated Tactical Environment Management System, and Close Combat Tactical Trainer Semi-Automated Forces.

12. Constructive Model or Simulation. See Live, Virtual and Constructive Simulation.

13. Data Certification. The determination that data have been verified and validated. Data user certification is the determination by the application sponsor or designated agent that data have been verified and validated as appropriate for the specific M&S usage. Data producer certification is the determination by the data producer that data have been verified and validated against documented standards or criteria.

14. Data Dictionary. A table or set of records whose values define the allowable content and meaning of attributes.

15. Data Quality. The correctness, timeliness, accuracy, completeness, relevance, and accessibility that make data appropriate for use. Quality statements are required for source, accuracy (positional and attribute), up-to-dateness/currency, logical consistency, completeness (feature and attribute) , clipping indicator, security classification, and releasability.

16. Data Verification, Validation, & Certification (VV&C) . The process of verifying the internal consistency and correctness of data, validating that it represents real world entities appropriate for its intended purpose or an expected range of purposes, and certifying it as having a specified level of quality or as being appropriate for a specified use, type of use, or range of uses. The process has two perspectives: producer and user process.

17. Data Validation. The documented assessment of data by subject area experts and its comparison to known values. Data user validation is that documented assessment of data as appropriate for use in an intended model. Data producer validation is that documented assessment within stated criteria and assumptions.

18. Data Verification. Data producer verification is the use of techniques and procedures to ensure that data meets constraints defined by data standards and business rules derived from process and data modeling. Data user verification is the use of techniques and-procedures to ensure that data meets user specified constraints defined by data standards and business rules derived from process and data modeling, and that data are transformed and formatted properly.

19. Defense Simulation Internet (DSI). A wide-band telecommunications network operated over commercial lines with connectivity to both military and civilian satellites, allowing users to be linked on a world-wide wide-area network (WAN).

20. Disaggregation. The ability to represent the behavior of an aggregated unit in terms of its component entities. If the aggregate representation did not maintain state representations of the individual entities, then the decomposition into the entities can only be notional.

21. Distributed Interactive Simulation (DIS).

a. Program to electronically link organizations operating in four domains: advanced concepts and requirements; military operations; research, development, and acquisition; and training.

b. A synthetic environment within which humans may interact through simulation(s) at multiple sites networked using compliant architecture, modeling, protocols, standards, and databases.

22. DoD M&S Executive Agent. A DoD Component to whom the USD(A&T) has assigned responsibility and delegated authority for the development and maintenance of a specific area of M&S application, including relevant standards and databases, used by or" common to many models and simulations.

23. Environmental Representation. An authoritative representation of all or a part of the natural environment, including permanent or semi-permanent man-made features.

24. Executive Agent. See DoD M&S Executive Agent.

25. Executive Council for Modeling and Simulations (EXCIMS). An organization established by the USD(A&T) responsible for providing advice and assistance on DoD M&S issues. Membership is determined by the USD(A&T) and is at the Senior Executive Service, flag, and general officer level.

26. Fidelity. The accuracy of the representation when compared to the real-world.

27. Functional Area. A functional area encompasses the scope (the boundaries) of a set of related functions and data for which an OSD Principal Staff Assistant or the Chairman of the Joint Chiefs of Staff has DoD-wide responsibility, authority, and accountability. A functional area (e.g., personnel) is composed of one or more functional activities (e;g; , recruiting) , each of which consists of one or more functional processes (e.g. , interviews) . Also known as a business area.

28. Functional Data Administrator (FDAd). An FDAd is a person or group that ensure the utility or data used within the Functional Area by defining data policies and standards, planning for the efficient use of data, coordinating data structures among organizational components, performing logical database design, and defining data security procedures.

29. General-use M&S Applications. Specific representations of the physical environment or environmental effects used by, or common to, many models and simulations (e.g. , terrain, atmospheric or hydrographic effects) .

30. Infrastructure. See M&S Infrastructure.

31. Intelligence Community Coordinating Group (ICCOG). The ICCOG serves as the intelligence community's forum for M&S exchange, fostering improved communication among community and other.. government agencies and industry. The ICCOG promotes sharing of programs, methodologies, tools, techniques, data and other information.

32. Intelligent Forces (IFOR). A specific program funded by ARPA to build a maximum of intelligent behavior into the computer representations of forces.

33. Interoperabi lity. See M&S Interoperability.

34. Joint M&S. Representations of joint and Service forces, capabilities, equipment, materiel, and services used by the joint community or by two, or more, Military Services.

35. Live Simulation. See Live, Virtual, and Constructive Simulation.

36. Live, Virtual, and Constructive Simulation. A broadly used taxonomy for classifying simulation types. The categorization of simulation into live, virtual, and constructive is problematic, because there is no clear division between these categories. The degree of human participation in the simulation is infinitely variable, as is the degree of equipment realism. This categorization of simulations also suffers by excluding a category for simulated people working real equipment (e.g., smart vehicles) .

a. Live Simulation. A simulation involving real people operating real systems.

b. Virtual Simulation. A simulation involving real people operating simulated systems. Virtual simulations inject human-in-the-loop (HITL) in a central role by exercising motor control skills (e.g., flying an airplane) , decision skills (e.g., commit-

ting fire control resources to action), or communication skills . . . . . (e.g. , as members of a C41 team) .

c. Constructive Model or Simulation. Models and simulations that involve simulated people operating simulated systems. Real people stimulate (make inputs) to such simulations, but are not involved in determining the outcomes.

37. Metadata. Data that describes data. Examples: definition, classification, accuracy, data type, precision, currency, source, effective dates, etc.

38. Mission Space. The environment of entities, actions, and interactions comprising the set of interrelated processes used by individuals and organizations to accomplish assigned tasks.

39. Model . A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process.

40. M&S Infrastructure. An underlying base or foundation; the basic facilities, equipment, installations and services needed for the functioning of a system. An M&S infrastructure would consist of M&S systems and applications, communications, networks, architectures, standards and protocols, information resource repositories, etc.

41. M&S Interoperability. The ability of a model or simulation to provide services to, and accept services from, other models and simulations, and to use the services so exchanged to enable them to operate effectively together.

42. M&S Working Group (MSWG) . The MSWG supports the activities of the EXCIMS and responds to guidance and direction from the USD(A&T) . The Director, DMSO, chairs the MSWG. The membership of the MSWG will normally be O-6 military officers or GM-15 grade civilians. The MSWG promotes coordination and cooperation of DoD M&S at the working level. Members will represent their organization, serve as the DMSO point of contact for M&S issues, and prepare their principals for EXCIMS meetings. MSWG membership will mirror the organizational makeup of the EXCIMS; however, other organizations may be added by majority vote of the group, as required.

43. Modular Semi-Automated Forces (ModSAF) . A class of CGF utilizing a modular software structure in which model components have well-defined and documented interfaces allowing run-time reconfiguration of model behavior to develop generalized, and more sophisticated, represent.ations of reactive behaviors and missions. ModSAF provides an open architecture that is expected to be the starting point for future extensions of SAFOR capabilities.

44. Multi-State Objects. Mission space entities that express a changing state (in attribution and visual display) as the simulation progresses (e.g., damage to structures, changes in vegetation, damage system representations such as vehicles, tanks, etc.).

45. Protocol. A set of rules and formats (semantic and syntactic) that determine the communication behavior of simulation applications.

46. Protocol Data Unit (PDU). DIS terminology for a unit of data that is passed on a network between simulation applications.

47. Resolution. The degree of detail and precision used in the representation of real-world aspects in a model or simulation; granularity.

48. Scalability. The ability of a distributed simulation to maintain time and spatial consistency as the number of entities and accompanying interactions increase.

49. Semi-Automated Forces (SAFOR). See Computer Generated Forces.

50. Simulation. A method for implementing a model over time.

51. Standard. A rule, principle, or measurement established by authority, custom, or general consent as a representation or example.

52. Synthetic Battlefield. One type of synthetic environment.

53. Synthetic Environments (SE). Internetted simulations that represent activities at a high level of realism from simulations of theaters of war to factories and manufacturing processes. These environments may be created within a single computer or over a distributed network connected by local and wide area networks and augmented by realistic special effects and accurate behavioral models. They allow visualization of and immersion into the environment being simulated.

54. Unified Combatant Command (UCC). One of the unified combatant commands established by the President of the United States according to 10 U.S.C. (reference (j)). Also referred to as Combatant Commands. (UCCs include: U. S. Atlantic Command; U.S. Central Command; U. S. European Command; U. S. Pacific Command; U. S. Southern Command; U. S. Space Command; U. S. Special Operations Command; U. S. Strategic Command; and, U. S. Transportation Command. (See definition 8 and Acronyms.)

55. Validation. The process of determining the extent to which a model or simulation is an accurate representation of the real world from the perspective of the intended use(s) of the model or simulation.

56. Verification. The process of determining that a model or simulation implementation accurately represents the developer's conceptual description and specification. Verification also evaluates the extent to which the model or simulation has been developed using sound and established software engineering techniques.

57. Virtual Prototype. A model or simulation of a system placed in a synthetic environment, and used to investigate and evaluate requirements, concepts, system design, testing, Production and sustainment of the system throughout its life cycle.

58. Virtual Simulation. See Live, Virtual, and Constructive Simulation